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ABSTRACT

A study was undertaken to determine if a criterion referenced test based on a Piagetian stage model of reading acquisition was related to grade level, to a standardized reading achievement test, and to a test of cognitive develcpmental level. Sixty first, second, and third grade children were administered a comprehensive test of basic skills. They were then given a Piagetian test of conservation, as well as a criterion referenced test made up of real and nonsense words in a sentence context that was designed to diagnose cognitive developmental reading level. The sentences containing the key words were presented in two alternate forms: one involving a production task (pronouncing the words) and one involving a multiple choice judgment task. The various tests were administered in several sessions, with the order of administration counterbalanced across subjects. The results provided support for a cognitive developmental approach to reading acquisition. The criterion referenced production test based on a cognitive developmental model showed a significant relationship to age-grade level, to a standardized measure of reading achievement, and to cognitive developmental level as indexed by the Piagetian conservation measure. The multiple choice judgment task did not show a significant developmental change. (FL)

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Relationship between Cognitive Developmental Reading Strategies and Conservation and Reading Achievement

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The present research is the outgrowth of an attempt to construct a criterion referenced test based on a Piagetian stage model of reading acquisition devised by the authors (Marsh, et al, in press). Most traditional approaches to measuring reading measure cognitive content and are based on an implicit model of continuous quantitative growth in which the child is assumed to progress towards proficient adult performance by measuring in speed, accuracy, and "automaticity." In contrast the present approach attempts to measure change in cognitive structure which results from qualitative changes associated with discrete stages of development. Previous research on a number of tasks including reading novel words in a story context, (Marsh, et al, 1980) spelling novel words and error detection in a proofreading task, (Marsh, et al, 1979) have provided empirical support for the cognitive developmental stage model outlined in Table 1. The examples shown in Table 1 are derived from the task in which the child pronounces novel words. According to the theory the child in each of these stages will produce qualitively different responses to the same stimuli. The responses are therefore an index of the childs cognitive developmental reading stage.

The major purpose of the present research was to try criterion referenced test based on the stages encompassed in the theory and to determine if the test was related to grade level, to standardized reading achievement test, and to a test of cognitive developmental level.

Method

The subjects were sixty children from a single elementary school in Paramount, California. There were 33 boys and 27 girls - twenty each from first, second, and third grades. All subjects had previously been given the McGraw-Hill comprehensive test of basic skills. (CTBS)

Procedure

All children were administered the Goldschmidt-Bentler Concept Assessment Kit (CAK) which is a Piagetian test of conservation yielding a continuous score. The children were also administered a criterion referenced test made up of real and nonsense words in a sentence context. The words were designed to tap ability to pronounce various English orthographic patterns which had previously been found to be diagnostic of cognitive developmental reading level. The various tests were administered in several sessions. The order of administration was counterbalanced across subjects. The sentences containing the key words were presented in two alternate forms. One form was a production task in which the subject was asked to orally pronounce the key word. The second form was a multiple choice judgement task in which various alternative responses were read by the tester and the child chose the correct alternative.

Results

The results were subjected to a one way analysis of variance using age-grade level as independent variable. There was a significant linear increase with development in the CAK scores ($F = 18.94$ df 1/57 $p<.001$) in the CTBS

scores ($F = 15.33$ df 1/57 $p<.001$) and in scores on the production test ($F = 25.19$ df 1/57 $p<.001$). The judgment test did not show a significant increase with age-grade level ($F = 1.04$ df 2/57 $p>.05$). A number of correlations were computed to look at the relationship between dependent variables and independent variables. In general the production scores on the cognitive developmental test correlated sigificantly with the conservation measure (CAK); ($r = .39$ $p<.001$) the standardized reading test (CTBS) ($r = .65$ $p<.001$) and age grade level ($r = .52$ $p<.001$).

The type of statgey as a function of age-grade level as seen in Table 5. In the first grade the psycholinguistic and discrimination net guessing strategy are dominent responses while by second grade the visual similarity and decoding errors are the modal response types.

Discussion

The present research study provides support for a cognitive-developmental approach to reading acquisition. A criterion referenced production test based on a cognitive developmental model showed a significant relationship to age-grade level, to a standardized measure of reading achievement and to cognitive developmental level as indexed by a Piagetian conservation measure.

The size of the correlations between the reading measures and the conservation measures are generally in the range reported by Waller (1977) in his survey of the literature. Although statistically significant the correlations show only a moderate relationship between traditional Piagetian

measures and the reading measures. It is evident that we can not conclude that ability to conserve is a necessary and sufficient condition for the use various strategies in reading. The cognitive developmental test included real words and these may be learned by figurative memory rather than requiring operative processes. In addition there is a large component of verbal fluency in the CAK since one-half of the total points are given for correct verbal justifications of the conservation response. Waller (1977) reports that the seriation task generally shows a much higher relationship to reading measures and might be a more promising cognitive measure for investigation.

The multiple choice judgment task did not show a significant developmental change. This result is consistent with the authors previous results comparing judgment and production tasks, (Marsh, Desberg & Cooper, 1977). In general production tasks seem to have greater utility than judgment tasks in measuring cognitive developmental changes in reading strategies.

In summary it appears that although there is a statistically significant relationship between a standardized measure of conservation and reading ability the relationship is not sufficiently strong to use for practical prediction. It would therefore be unwise to assign children to different reading treatments based on their classification as pre-operational or concrete operational based on a conservation test. We would advocate the development on Piagetian diagnostic-prescriptive measures specifically in the reading domain.

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